

Amendments to the Specification

Please replace paragraph [0019] with the following rewritten paragraph:

$\beta^1$  [0019] In an ideal evacuation process, it is known that the pressure is reduced by the exponential function  $e^{-1}$ . The value (V/S) of the evacuated volume (V) divided by the pumping speed (S) is defined as the "evacuation time constant". When a time corresponding to the evacuation time constant elapses, the pressure falls to 37 percent ~~of~~or  $e^{-1}$ . After the elapse of five times that amount of time, the pressure falls to 1 percent ~~of~~or  $e^{-5}$ . Therefore, the evacuation time constant at the reaction chamber 901 corresponds to the response of measurement and determines by what extent of delay the change in concentration of the detection gas in the reaction chamber 901 tracks the change in concentration in the detection space.

Please replace paragraph [0042] with the following rewritten paragraph:

$\beta^2$  [0042] Further, the present inventors studied the reduction in the background (interference peaks) required second for quantitative analysis. As a result, they pinpointed four factors of "evacuation time constant", "dwell rate", "contamination by pump", and "gas ~~emitted~~emitted from container" and showed that these could be solved by the following means: (1) for the evacuation time constant, reduction of the inside volume of the reaction chamber and increase of the effective evacuation, (2) for the dwell rate, elimination of corners or depressions in the reaction chamber to make the flow of the gas smooth and in one direction, (3) for the contamination by the pump, use of a dry pump free from backflow of oil for evacuation of the reaction chamber, and (4) for the gas emitted from the container, use of a metal-based seal for the seal of the reaction chamber and treatment of the inside wall surface of the reaction chamber by polishing, immobilization, and precision washing.

Please replace paragraph [0046] with the following rewritten paragraph:

β<sup>3</sup> [0046] In the above methods of ion attachment mass spectrometry, a quantitative value is calculated for each component using the sensitivity corresponding to the total pressure during measurement. In the calculation, the quantitative value is obtained by dividing the signal obtained by the mass spectrometer by a coefficient relating to the sensitivity for ~~reach~~each component.

Please replace paragraph [0067] with the following rewritten paragraph:

β<sup>4</sup> [0067] A first embodiment of the ion attachment mass spectrometry apparatus according to the present invention will be explained next with reference to FIG. 1. First, the constituent elements will be explained. In FIG. 1, 11 is a reaction chamber, 12 a first differential evacuation chamber, 13 a second differential evacuation chamber, 14 an analysis chamber, 15 a gas introduction mechanism, 16 an evacuation mechanism, and 17 a data processor. Reference numeral ~~22~~21 is an emitter, 22 a first aperture, 23 a reaction chamber seal, 24 a reaction chamber vacuum gauge, and 25 a baking mechanism. Further, reference numeral 31 is a second aperture, 32 a partition of the first differential evacuation chamber, 33 a first differential evacuation chamber vacuum gauge, ~~334~~34 a fine total pressure signal line (for example, a signal able to give a continuous value or discrete values close to the same), 41 a third aperture, 42 a partition of the second differential evacuation chamber, 43 an electrostatic lens, and 51 a Q-pole mass spectrometer. Reference numeral 61 is a detection space, 62 a pipe, and 63 a flow rate adjustment valve. Reference numeral 76 is a first differential evacuation chamber dry pump, 77 a second differential evacuation chamber dry pump, and 78 an analysis chamber dry pump. The detection gas is present in the detection space 61 in a 100 percent concentration or contained in a base gas.

Please replace paragraph [0070] with the following rewritten paragraph:

*B5* [0070] Further, the reaction chamber 11 is a streamlined ~~type-type~~ with no depressions or corners. The inside wall surface is polished, immobilized, and precision washed. A metal based material is used for the reaction chamber seal 23. The pipe 62 of the gas introduction mechanism 15 is attached at the upstream-most part of the reaction chamber 11. The first differential evacuation chamber dry pump 76 is an axial flow molecular pump, while the second differential evacuation chamber dry pump 77 and the analysis chamber dry pump 78 are made turbo molecular pumps.

Please replace paragraph [0081] with the following rewritten paragraph:

*pl* [0081] Next, in actual measurement, the following processing is performed. The quantitative analysis related to the detection gas is measured and the total pressure of the reaction chamber 11 or the reaction chamber 11 and the first differential evacuation chamber 12 during measurement is measured. The data processor 17 receives as input a mass signal from the Q-pole mass spectrometer 51 and the fine total pressure signals from the reaction chamber vacuum gauge 24 and the differential evacuation chamber vacuum gauge 33 in substantially real time. As the total pressure signal, a value with two effective digits is for example input every second at a one second delay. In the data processor 17, the processing means 17a calls up the sensitivity corresponding ~~to the~~ to the component being actually measured and the total pressure and calculates the quantitative value by dividing the mass signal of the Q-pole mass spectrometer 51 by the sensitivity (coefficient relating to sensitivity).

[ Please replace paragraph [0082] with the following rewritten paragraph: ]

[0082] In this way, in the present embodiment, since the sensitivity corresponding to the pressure during measurement is used in the quantitative calculations, the total pressure of the reaction chamber and the first differential evacuation chamber can be set to any value.

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Further, since the total pressure of the reaction chamber and the first differential evacuation chamber is not feedback controlled, it may fluctuate along with ~~time~~time, but the processing for input of the total pressure signal, input of the mass signal, and calculation of the quantitative value is substantially performed in real time, so even if the pressure fluctuates, it is possible to always calculate the correct quantitative value.

Please replace paragraph [0110] with the following rewritten paragraph:

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[0110] In the above embodiments, the dependency on total pressure was considered, but when finding the sensitivity more precisely, it is also possible to consider the dependency on the partial pressure, not just the total pressure. This is achieved by changing the temperature and finding the sensitivity at each when introducing a gas of a known concentration and specific component into the detection space in the preliminary measurement. The technique for correcting the sensitivity when it is not constant with respect to an amount of presence corresponds to the well known calibration curve method. In the conventional calibration curve method, however, it is assumed that ~~ther~~there are no changes in sensitivity due to the total pressure, but the present invention differs in that the sensitivity or calibration curve are grasped as distinctive quantities at a specific total pressure.

Please replace paragraph [0114] with the following rewritten paragraph:

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[0114] In the above embodiments, use was made of the ~~lightest~~lightest  $\text{Li}^+$  as the metal ions, but the invention is not limited to this. It is also possible to use  $\text{K}^+$ ,  $\text{Na}^+$ ,  $\text{Rb}^+$ ,  $\text{Cs}^+$ ,  $\text{Al}^+$ ,  $\text{Ga}^+$ ,  $\text{In}^+$ , etc. Further, as the mass spectrometer, use was made of a Q-pole type mass spectrometer and three-dimensional (3D) type mass spectrometer, but the invention is not limited to this. It is also possible to use a magnetic field sector type mass spectrometer, time-of-flight (TOF) type mass spectrometer, or ion cyclotron resonance (ICR) type mass spectrometer.